

Title: Planning adaptive health systems: the climate challenge.

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More details/abstract: In 2011, a group of delegates at the UN framework Convention on Climate Change's 17th Conference of the Parties signed the Durban Declaration, stating “The World Health Organization predicts that unmitigated climate change will lead to significant increases in illness and death brought on by environmental changes.”¹ The Lancet called climate change the greatest global health threat of the 21st Century.² The effects of climate change on health have begun to be well established,^{2,3} but despite global and regional efforts⁴ to make connections between climate and health, planning and policy development continues to occur separately.

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In 2011, a group of delegates at the UN framework Convention on Climate Change's 17th Conference of the Parties signed the Durban Declaration, stating "The World Health Organization predicts that unmitigated climate change will lead to significant increases in illness and death brought on by environmental changes."¹ *The Lancet* called climate change the greatest global health threat of the 21st Century.² The effects of climate change on health have begun to be well established,^{2,3} but despite global and regional efforts⁴ to make connections between climate and health, planning and policy development continues to occur separately. Little attention has been paid to the health systems that must adapt to deliver services that can respond to changing disease patterns and health needs of people.

Climate change will have far-reaching effects on how we build, organise, and manage health systems as complex institutions.⁵ Yet, to date, these challenges have largely been ignored by the research community. Despite substantial work by WHO on the interface between climate and health,⁶ two major conferences on health systems, failed to consider climate-related issues. On the eve of WHO's third Health Systems Global conference (Sept 29–Oct 3), we highlight some key implications of climate change for health systems to form the basis of an agenda for research and action.

First, disease surveillance, and the development and maintenance of early-warning mechanisms of climate change, will need to become a key function of health systems, if they are to be able to forecast and adequately prepare to meet changing disease-patterns and health needs. Developed countries have initiated surveillance and early-warning systems and planning tools,⁷ but initiatives elsewhere are ad-hoc, and the capacity to translate complex scientific data (from different specialist fields) into planning goals and implementation plans is often weak.^{8,9}

Second, management of changing patterns of disease will necessitate planning for, and financing of, changing supply chains for drugs and test-kits and additional training for medical staff. This planning and financing requires both medium-long-term planning based on surveillance of changing patterns of disease and short-term emergency response planning to cope with extreme weather events.

Third, new infrastructure projects must be climate-safe (eg, above projected sea-level rises, away from flood zones) and green (ie, reducing or contributing zero greenhouse-gas emissions from within the health system). Climate science, with its many feedback loops, is imprecise; nevertheless, to avoid, for example, flood-prone areas for major new hospital complexes seems sensible. In some areas, mobile and outreach clinics could perhaps replace static health posts and centres.

Fourth, climate-induced migration is now a recognised phenomenon.³ Forecasting population movements and growth dynamics is necessary for planning and management of health systems responding to emerging population needs, both short term, akin to humanitarian relief, and longer term as populations have to resettle.

Two themes cross cut each of these issues in consideration of how to develop and implement adaptive health systems that incorporate surveillance, emergency-response, and long-term planning functions and facilitate institutional change and interaction.

The first theme is that these challenges are global and urgently need a transdisciplinary response across different institutions. WHO has noted that "While health actors can do much within their own ministries or facilities, a truly effective public health response [to climate challenges] will depend on actions taken across government and by other partners".⁵ These partners include climate scientists modelling change-scenarios, agriculture and food security experts, hydrogeologists, microbiologists, energy decision-makers, and so on. Such partnerships will require institutional change since, to be effective, health institutions must engage with other governmental, civil society, and private sector agencies involved in policy making and planning across different sectors. Operationalised partnerships would contribute to building and sustaining what the International Panel on Climate Change calls "climate resilient pathways".³ With the renewed focus on complexity in health-care systems,¹⁰ health-systems researchers are well positioned to lead efforts to build adaptive health-care systems and effective institutions capable of planning and managing responses to climate change while progressing together with other social-ecological systems.

The second theme is that, in view of the intersectoral nature of the response required, there is a need for

adapted governance to protect health. The final draft Sustainable Development Goals,¹¹ which show potential for multiple interactions (positive and negative) between health and other goals on food and water security, energy, and technologies, underline this further. Yet they offer no governance or planning framework to facilitate and broker such an intersectoral response. For such actions to be effective, new forms of governance need to be developed and health and health-systems planners have an important part to play.

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We declare no competing interests.

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